

SUPPLEMENT TO “ELLSBERG REVISITED: AN EXPERIMENTAL
STUDY—INSTRUCTIONS AND DATA
(*Econometrica*, Vol. 75, No. 2, March, 2007, 503–536)

BY YORAM HALEVY

THIS DOCUMENT CONTAINS the instructions used for the study, as well as complete data.

1. CONSENT FORM—FIRST ROUND

Principal Investigator

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Purpose

Ambiguity is characterized by a situation in which a decision is made when the consequences of actions are uncertain and it is hard to describe them in a simple probabilistic form. The purpose of this study is to compare different explanations of individual's behavior in these situations.

Study Procedures

You will be offered to bet in four different situations and allowed to set a minimal selling price for each bet. The selling price you set should reflect your true valuation for each bet, at which you will agree to exchange the bet for a certain payment. The selling mechanism used guarantees you cannot profit by misreporting your valuations. All randomizations are performed using a computerized random number generator. The experiment takes up to 15 minutes. Your compensation will be random (see below).

Confidentiality

Any information resulting from this research study will be kept strictly confidential. Participants will not be identified by name in any reports of the completed study. Access to data records that are kept on a computer hard disk will require a password.

Remuneration/Compensation

To defray the costs of your participation, you will receive the right to participate in four lotteries. For each lottery you win, you will be paid \$2. You can potentially win four lotteries. Please note that the final payment you receive will depend on the selling prices you state, the buying prices offered, and the outcomes of the lotteries.

Contact

If you have any questions or desire further information with respect to this study, you may contact Yoram Halevy at 604-822-2202.

If you have any concerns about your treatment or rights as a research subject you may contact the Director of Research Services at the University of British Columbia at 604-822-8598.

Consent

I understand that my participation in this study is entirely voluntary and that I may refuse to participate or may withdraw from the study at any time without jeopardy to my class standing, etc.

I have received a copy of this consent form for my own records.

I consent to participate in this study.

Subject Signature

Date

Please Tell Us about Yourself

This information is required for us to identify you for payment purposes and will be kept confidential.

Name: _____

E-mail Address: _____

Student ID: _____ Age: _____ Gender: M F

Number of years of university completed: 0 1 2 3 4+

Major _____

Number of 200+ courses in: Economics _____ Mathematics _____

Explanation

Consider the following scenario. There are four boxes, each containing 10 balls, which can be either red or black. The composition of balls in the boxes is as follows:

Box 1: Contains 5 red balls and 5 black balls.

Box 2: The number of red and black balls is unknown. It could be any number between 0 red balls (and 10 black balls) and 10 red balls (and 0 black balls).

Box 3: The number of red and black balls is determined as follows. One ticket is drawn from a bag containing 11 tickets with the numbers 0 to 10 written on them. The number written on the drawn ticket will determine the number of red balls in the third box. For example, if the ticket drawn is 3, then there will be 3 red balls and 7 black balls.

Box 4: The composition of balls in this box is determined in a similar way similar to box 3. The difference is that instead of 11 tickets in the bag, there are 2, with the numbers 0 and 10 written on them. Therefore, the box may contain either 0 red balls (and 10 black balls) or 10 red balls (and 0 black balls).

You are asked to place a bet on the color of the ball drawn from each box (note that for boxes 3 and 4, you do not know what ticket is drawn from the bag when you place your bet). If your bet on a specific box is correct, you could win \$2. If your bet is incorrect, nothing will happen. For example, if your bets on boxes 1 and 3 are correct, but your bets on boxes 2 and 4 are incorrect, you will win a total of \$4.

Before balls are drawn from each box (and before the tickets are drawn from the bags for boxes 3 and 4), you may sell each one of your bets. You are asked to state four **minimal** prices at which you are willing to sell each one of the bets. For each box, a random number between \$0 and \$2 will be generated. The four random numbers will be the buying prices for each one of the bets.

If the buying price for a box is higher than the minimal selling price you stated for that box, you will be paid the buying price (and will not have to wait for the outcome of your bet). However, if the buying price for the box is lower than the minimal selling price you stated for that box, your payment will depend on the outcome of your bet.

Note that it is in your best interest not to overstate your selling prices because this lowers the chances you will be able to sell your bet and does not increase the buying price.

Likewise, it is in your best interest not to understate your selling price, because this may force you to sell a bet at a price that is lower than your valuation of the bet.

For example, suppose you want to sell a \$1 coin you have. Clearly its value is exactly \$1. If you state a selling price higher than \$1 (say \$1.50), you might not be able to sell it even if the buying price is as high as \$1.49—a profitable transaction. Likewise, if you state a selling price lower than \$1 (say \$0.75), you might be forced to sell your coin at a loss (if the buying price is between 75 and 99). The only way you are sure not to lose is if you state a selling price of exactly your valuation (\$1 in this case).

It is important that your stated selling prices reflect how attractive each bet is: the more attractive it is for you to participate in a bet, the higher the selling price you should state.

2. CONSENT FORM—ROBUSTNESS ROUND¹

Comment:

Principal Investigator

Professor Yoram Halevy
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Purpose

Ambiguity is characterized by a situation in which a decision is made when the consequences of actions are uncertain and it is hard to describe them in a simple probabilistic form. The purpose of this study is to compare different explanations of individual's behavior in these situations.

Study Procedures

You will be offered to bet in four different situations and allowed to set a minimal reservation price for each bet. The reservation price you set should reflect your true valuation for each bet: this is the **minimal** amount of sure payment you will agree to exchange for the bet. The elicitation mechanism used guarantees you cannot gain by setting a reservation price that is higher or lower than the minimal reservation price above. All randomizations are performed using a computerized random number generator. The experiment takes up to 15 minutes. Your compensation will be random (see below).

Confidentiality

Any information resulting from this research study will be kept strictly confidential. Participants will not be identified by name in any reports of the completed study. Access to data records that are kept on a computer hard disk will require a password.

Remuneration/Compensation

To defray the costs of your participation, you will receive the right to participate in four lotteries with a potential prize of \$20 in each and will be offered to substitute a sure payment for each lottery. Please note that the final payment you receive will depend on the minimal reservation prices you set, random numbers, and the outcomes of the lotteries.

¹This is the consent form for the order treatment (1, 2, 3, 4).

Contact

If you have any questions or desire further information with respect to this study, you may contact Yoram Halevy at 604-822-2202.

If you have any concerns about your treatment or rights as a research subject you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598.

Consent

I understand that my participation in this study is entirely voluntary and that I may refuse to participate or may withdraw from the study at any time without jeopardy to my class standing, etc.

I have received a copy of this consent form for my own records.

I consent to participate in this study.

Subject Name	Subject Signature	Date
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Explanation

Consider the following scenario. There are four boxes, each containing 10 chips, which can be either red or black. The composition of chips in the boxes is as follows:

Box 1: Contains 5 red chips and 5 black chips.

Box 2: The number of red and black chips is unknown. It could be any number between 0 red chips (and 10 black chips) and 10 red chips (and 0 black chips).

Box 3: The number of red and black chips is determined as follows: one ticket is chosen from a bag containing 11 tickets with the numbers 0 to 10 written on them. The number written on the drawn ticket will determine the number of red chips in the third box. For example, if the ticket drawn is 3, then there will be 3 red chips and 7 black chips.

Box 4: The composition of chips in this box is determined in a manner similar to box 3, but instead of 11 tickets in the bag, there are 2, with the numbers 0 and 10 written on them. Therefore, the box may contain either 0 red chips (and 10 black chips) or 10 red chips (and 0 black chips).

You are asked to place a bet on the color of the ball drawn from each box. Note that for boxes 3 and 4, you do not know the color composition of the box (what ticket is drawn from the bag) when you place your bet. If your bet on a specific box is correct, you could win \$20. If your bet is incorrect, nothing will happen. For example, if your bets on boxes 1 and 3 are correct, but your bets on boxes 2 and 4 are incorrect, you will win a total of \$40.

Before chips are drawn from each box (and before the tickets are drawn from the bags for boxes 3 and 4), you are asked to set four **minimal** amounts of

money you are willing to substitute for each bet. These will be called your *reservation prices*.

For each box, a random number between \$0 and \$20 will be generated.

If the random number for a box is higher than the reservation price you set for that box, you will be paid the random number (and your payment will not depend on the outcome of your bet). However, if the random number for a box is lower than the reservation price you stated for that box, your payment will depend on the outcome of your bet.

It is in your best interest not to overstate your reservation price, because this lowers the chances you will substitute a high random number for the lottery. Likewise, it is in your best interest not to understate your reservation price, because the random number might be lower than your actual reservation price, forcing you to substitute the low random number for the bet.

For example, suppose you want to set your reservation price for a \$5 bill you have. Clearly its value is exactly \$5. If you state a reservation price higher than \$5 (say \$8), you will not be able to substitute a high random number (between \$5.01 and \$7.99) for the bill, resulting in losing a profitable transaction. Likewise, if you state a reservation price lower than \$5 (say \$4), and the random number is between \$4.01 and \$4.99, you might be forced to substitute the \$5 for a lesser amount. The only way you are sure not to lose (potential gains or portion of the \$5) is if you set a reservation price that exactly equals your valuation (\$5 in this case).

Before you are asked to set your minimum reservation prices for the four lotteries, you will be given a \$2 coin and a pen. You are asked to set your minimum reservation prices for these items. The random number for each of them will be between \$0 and \$4.

Then you will be given an unpaid trial round with the four boxes, and then a paid round with the four boxes.

Please Tell Us about Yourself

This information is required for us to identify you for payment purposes and will be kept confidential.

Name: _____

E-mail Address: _____

Student ID: _____ Age: _____ Gender: M F

Number of years of university completed: 0 1 2 3 4+

Major _____

Number of 100 level courses in: Economics _____ Mathematics _____

Number of 200+ level courses in: Economics _____ Mathematics _____

Please Answer the Following Questions

- What is your minimum reservation price for the \$2 coin?

_____ (between 0 and 4)

Random number _____

- What is your minimum reservation price for the pen? _____
(between 0 and 4)

Random number _____

Trial Round

1. What is your bet for box 1? (circle one) red black
What is your minimal reservation price for the bet on box 1?
_____ (between 0 and 20)

Random number _____
Outcome if random number < reservation price: _____

2. What is your bet for box 2? (circle one) red black
What is your minimal reservation price for the bet on box 2?
_____ (between 0 and 20)

Random number _____
Outcome if random number < reservation price: _____

3. What is your bet for box 3? (circle one) red black
What is your minimal reservation price for the bet on box 3?
_____ (between 0 and 20)

Random number _____
Outcome if random number < reservation price: _____

4. What is your bet for box 4? (circle one) red black
What is your minimal reservation price for the bet on box 4?
_____ (between 0 and 20)

Random number _____
Outcome if random number < reservation price: _____

Paid Round

1. What is your bet for box 1? (circle one) red black
What is your minimal reservation price for the bet on box 1?
_____ (between 0 and 20)

Random number _____
Outcome if random number < reservation price: _____

2. What is your bet for box 2? (circle one) red black
What is your minimal reservation price for the bet on box 2?
_____ (between 0 and 20)

Random number _____
Outcome if random number < reservation price: _____

3. What is your bet for box 3? (circle one) red black

What is your minimal reservation price for the bet on box 3?

_____ (between 0 and 20)

Random number _____

Outcome if random number < reservation price: _____

4. What is your bet for box 4? (circle one) red black

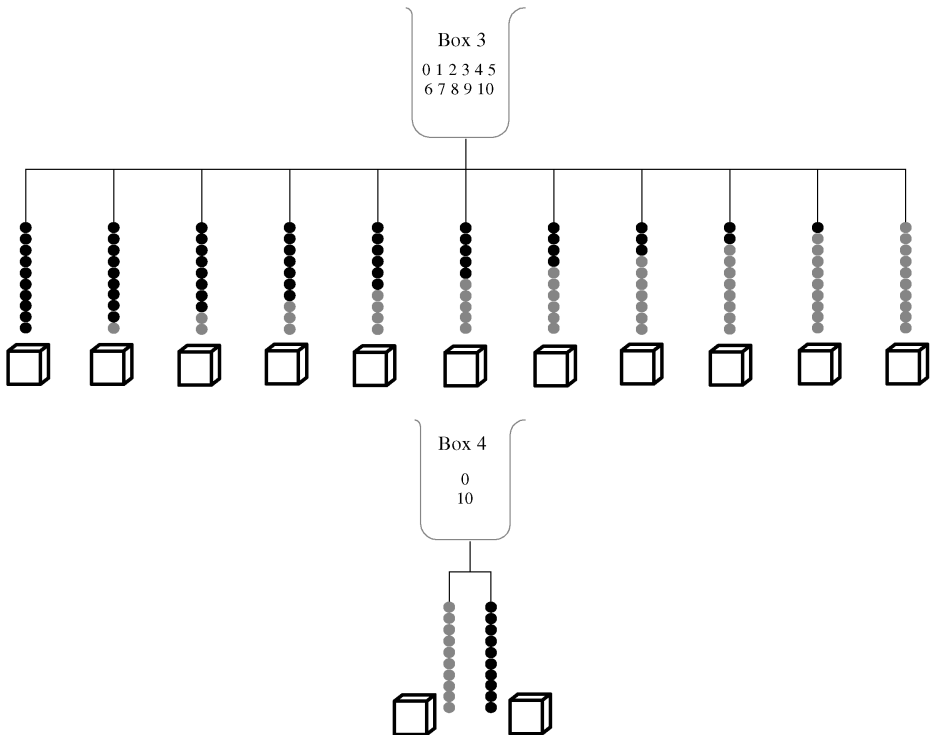
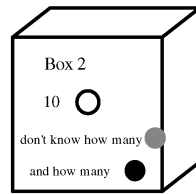
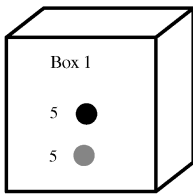
What is your minimal reservation price for the bet on box 4?

_____ (between 0 and 20)

Random number _____

Outcome if random number < reservation price: _____

3. THE LOTTERIES



4. DATA: ROUND WITH \$2 PRIZE

TABLE I

Index	V1	V2	V3	V4	Age	M/F	# Years in Univ.	Major	#200+ Courses in Econ.	#200+ Courses in Math.
1	0.90	0.80	0.90	0.90	20	F	2	english	0	0
2	1.20	0.90	0.80	0.80	20	F	2	poli_sci	0	0
3	1.00	1.00	0.98	1.00	22	F	4	international bus.	yes	0
4	1.26	0.58	1.00	1.00	19	M	1	undeclared	0	0
5	1.00	1.00	1.00	1.00	19	F	0	commerce	0	0
6	1.00	0.60	0.80	0.40	19	F	1	psyc	0	0
7	1.00	1.00	1.00	0.79	21	M	0	undeclared	0	0
8	1.00	0.80	0.80	1.00	24	F	4	biology	0	0
9	0.75	0.75	0.75	0.90	20	F	2	commerce	0	0
10	1.80	1.80	1.50	1.80	19	F	1	marketing	1	0
11	1.00	1.00	1.00	1.00	23	F	4	commerce	2	0
12	1.23	0.86	0.71	1.39	19	M	2	microbiology	1	1
13	1.25	1.00	0.80	1.00	20	F	3	commerce	1	0
14	1.20	0.99	0.88	0.79	20	F	1	undeclared	0	0
15	1.25	1.00	0.85	1.00	18	F	1	arts	0	0
16	0.99	1.00	0.90	1.00	20	F	1	undeclared	2	2
17	1.00	0.74	0.88	0.71	22	M	3	psyc	5	2
18	1.29	1.16	1.00	1.00	18	M	0	undeclared	0	0
19	1.00	0.90	0.89	0.78	17	F	2	psyc	0	0
20	1.00	0.40	1.20	0.06	18	F	0	science	0	0
21	0.99	0.80	0.90	1.00	18	F	0	science	0	0
22	1.00	1.00	1.00	1.00	18	M	0	commerce	0	0
23	1.10	1.20	1.00	1.00	19	M	0	BSCN	0	0
24	1.00	0.54	0.39	0.80	19	M	0	undeclared	0	0
25	1.34	1.00	0.90	1.00	18	F	0	agri_sci	0	0
26	1.24	1.20	1.22	1.30	18	M	0	geography	0	0
27	1.10	1.01	0.90	1.19	19	M	1	sociology	0	0
28	1.00	1.00	1.00	1.00	21	F	2	arts	3	2
29	1.12	0.73	0.68	0.92	21	M	2	biology	0	0
30	0.80	0.80	0.80	0.80	21	M	2	science	0	0
31	0.20	1.40	0.40	0.11	21	F	2	psyc	0	0
32	0.92	0.61	1.16	0.68	21	F	2	psyc	0	0
33	1.00	0.34	1.00	0.20	NA	F	1	psyc	0	0
34	0.37	0.52	0.67	0.81	20	F	2	psyc	0	0
35	0.90	1.00	1.10	0.90	18	M	1	chemistry	0	3
36	0.26	0.56	0.36	0.61	24	F	4	BA(IR), education	9	0
37	1.00	1.00	1.00	1.00	34	F	0	n/a	0	0
38	0.69	0.48	0.24	0.76	24	M	2	accounting	2	0
39	1.00	0.44	0.60	1.00	20	M	3	forestry	0	0
40	1.44	1.39	1.39	1.00	21	F	3	marketing	1	0
41	1.22	0.82	0.82	0.82	22	F	3	psyc	0	0
42	0.80	0.68	0.78	0.68	NA	F	2	biology	0	0

Continues

TABLE I—Continued

Index	V1	V2	V3	V4	Age	M/F	# Years in Univ.	Major	#200+ Courses in Econ.	#200+ Courses in Math.
43	0.81	0.94	1.00	0.80	39	F	4	psyc	0	0
44	0.98	1.00	0.99	0.98	21	F	2	commerce	2	0
45	1.50	1.40	1.60	1.50	18	M	1	undeclared	0	0
46	1.36	1.20	1.00	0.90	18	M	0	science	0	0
47	1.42	1.00	0.97	0.81	19	M	1	psyc	0	0
48	0.98	1.18	2.00	0.61	NA	F	n/a	n/a	0	0
49	0.87	1.19	0.61	0.84	NA	F	n/a	n/a	n/a	n/a
50	1.00	1.00	1.00	1.00	19	F	1	n/a	0	0
51	0.33	0.13	0.93	0.33	35	F	n/a	n/a	n/a	n/a
52	0.10	0.20	0.40	0.10	NA	F	n/a	n/a	n/a	n/a
53	1.00	0.73	0.80	0.67	20	F	1	commerce	1	0
54	1.00	0.50	0.80	2.00	22	M	4	psyc	0	0
55	1.01	0.42	0.69	0.90	23	F	3	arts	0	0
56	2.00	1.50	1.20	1.00	19	F	0	undeclared	0	0
57	0.66	0.84	0.37	0.66	22	F	2	undeclared	0	0
58	1.20	1.20	1.20	0.90	20	F	2	biochemistry	0	1
59	1.37	0.80	1.43	1.19	20	F	2	biochemistry	0	1
60	1.00	0.81	0.79	0.20	21	F	3	psyc	0	0
61	1.22	1.20	1.10	1.08	23	F	4	human ecology	2	2
62	0.99	0.90	1.41	0.76	18	F	0	arts	0	0
63	data lost in a computer crash				NA	F	4	law	0	0
64	0.70	0.86	0.51	0.70	26	F	4	urban planning	0	2
65	1.00	1.00	1.00	1.00	20	F	2	FNLL	0	0
66	1.00	1.00	1.00	1.00	20	F	3	psyc	0	1
67	0.99	0.88	1.24	0.52	21	F	2	psyc	0	0
68	1.60	0.94	0.96	1.60	20	F	2	science	0	1
69	1.50	1.00	0.99	1.30	23	F	0	n/a	0	0
70	0.90	0.73	0.77	0.77	20	F	3	commerce	1	0
71	1.00	0.51	0.13	1.00	20	F	2	computer engineer	0	2
72	1.00	1.00	1.00	1.00	20	M	2	computer engineer	0	3
73	1.00	1.00	1.00	1.00	23	M	4	cpsc	0	20
74	1.30	0.80	0.70	0.30	20	M	2	cpsc	2	4
75	0.99	0.99	0.99	0.99	23	M	4	cpsc	0	2
76	0.99	1.00	1.00	1.00	19	M	2	engineering	0	3
77	1.50	1.50	1.50	1.50	23	M	4	math	0	10
78	1.20	0.99	1.02	1.40	19	M	2	computer engineer	0	5
79	1.40	0.14	0.40	1.30	19	M	3	engineering	0	4
80	1.00	1.00	1.00	1.00	25	F	4	pharmacy	0	1
81	0.82	0.76	0.66	0.66	22	F	3	nutritional science	0	0
82	1.30	1.10	1.00	1.06	20	M	3	pharmacy	0	0
83	1.02	0.99	1.06	0.97	19	F	0	arts	0	0
84	1.50	1.20	1.00	1.20	19	F	1	arts	0	0
85	2.00	1.00	1.00	2.00	19	M	1	microbiology	0	0

Continues

TABLE I—*Continued*

Index	V1	V2	V3	V4	Age	M/F	# Years in Univ.	Major	#200+ Courses in Econ.	#200+ Courses in Math.
86	1.00	0.41	1.00	0.26	20	M	2	psyc	0	0
87	0.79	0.22	0.98	0.39	25	F	3	psyc	7	2
88	1.00	0.88	0.76	1.06	21	F	3	english	0	0
89	1.61	0.39	1.78	1.00	21	F	3	biochemistry	0	1
90	1.00	0.78	0.51	0.68	18	F	0	science	0	0
91	1.00	0.00	1.02	1.48	22	M	3	geography	1	0
92	1.30	1.30	1.30	1.30	22	M	4	econ	5	5
93	1.00	1.00	1.00	1.00	18	F	0	undeclared	0	0
94	0.60	0.80	0.60	0.80	20	F	0	undeclared	0	0
95	0.50	0.50	0.40	0.40	20	F	2	interdisciplinary	0	0
96	1.50	1.00	1.50	1.22	19	F	1	psyc	0	0
97	0.98	0.58	0.98	1.03	19	F	0	arts	0	0
98	1.00	1.00	1.00	1.00	20	M	2	math	6	10
99	0.70	0.60	0.75	0.90	21	F	2	law	0	0
100	1.50	1.00	1.00	1.50	20	F	2	stats + econ	3	8
101	1.49	0.99	1.02	1.48	20	M	2	math	4	8
102	0.40	0.60	0.60	2.00	20	M	2	psyc	0	3
103	1.00	1.12	0.97	1.01	21	M	3	biochemistry	0	1
104	1.87	1.83	1.20	1.66	21	F	3	biochemistry	0	1
105	0.98	1.00	1.11	1.00	21	F	3	biochemistry	0	1

5. DATA: ROUND WITH \$20 PRIZE

TABLE II

Index	I/1	I/2	I/3	I/4	Order of Boxes ^a	Age	M/F	# of Years in Univ.	Degree	Major	#100 Courses in Econ.	#100 Courses in Math.	#200+ Courses in Econ.	#200+ Courses in Math.
1	8	6	10	8	1	30	m	2	BA	science	1	1	0	0
2	10	10	10	10	1	19	m	1	BSc	Biology and CS	0	2	0	1
3	10	5	6	9	1	19	m	1	BA	Political Science	2	2	0	0
4	2	10	5	3	1	45	f	3	BA	English Lit.	0	0	0	0
5	5.5	6.5	8	10	1	18	f	0	BA	English	0	0	0	0
6	13	9.5	14	10	1	18	m	0	BSc	science	0	2	0	0
7	2	1	4	10	1	19	m	1	BSc	science	0	2	0	0
8	10	10	10	10	1	20	f	3	BA	psychology	2	1	0	0
9	5	2	10	2	1	19	m	1	BSc	Microbiology	0	2	0	0
10	10	5	5	5	2	19	m	1	BSc	Biology	2	2	2	n/a
11	10	10	10	10	2	n/a	m	2	BSc	Biology	0	1	0	0
12	10	4	6	5	2	n/a	f	2	BA	Psychology	1	2	0	0
13	13	10	9.15	12.75	2	20	m	1	BSc	Chemistry	0	2	0	2
14	10	4	5	10	2	19	f	2	BSc	Science	1	2	0	1
15	10	6	5	2	2	18	f	0	BA	n/a	0	2	n/a	n/a
16	10	8	8	10	2	20	m	1	BA	C.S.	0	2	0	0
17	7	6	7.75	9.5	2	19	m	0	BA	n/a	2	2	0	0
18	10	5	5	10	2	19	m	0	BSc	science	0	2	0	0
19	6	5	6	8	3	21	f	2	BSc	Biology	1	2	0	0
20	6	7	8	9	3	18	f	0	BA	Global Resource System	0	0	0	0

Continues

TABLE II—Continued

Index	V1	V2	V3	V4	Order of Boxes ^a	Age	M/F	# of Years in Univ.	Degree	Major	#100 Courses in Econ.	#100 Courses in Math.	#200+ Courses in Econ.	#200+ Courses in Math.
21	5	5	5	5	3	18	m	0	BA	n/a	2	0	0	0
22	10	5	5	10	3	19	m	0	BA	n/a	2	2	0	0
23	10	5	6	10	3	21	m	1	BSc	n/a	2	2	0	0
24	10	13	8	17	3	18	f	0	BA	n/a	1	n/a	n/a	n/a
25	3	3.75	4	2	3	21	f	3	BA	French	0	0	0	0
26	6.5	5	3.5	6	3	n/a	n/a	1	BA	IR	2	0	0	0
27	5	2	2	2	3	18	m	0	BSc	Math, C.S.	0	2	0	0
28	12	8	8	12	3	19	m	0	BA	n/a	1	0	0	0
29	5	3	4	4	4	n/a	n/a	0	BA	Modern European Studies	1	0	0	0
30	15	8	5	5	4	18	f	0	BSc	General Science	0	2	0	0
31	10	7	6	8	4	18	f	0	BSc	biology	0	2	0	0
32	8	12	15	10	4	19	m	0	BA	n/a	0	0	0	0
33	10	11	15	7	4	20	m	1	BA	English	0	0	0	0
34	8	10	10	8	4	n/a	n/a	3	BSc	Microbiology	0	2	0	0
35	5	3	4	2	4	19	f	0	BA	Marine Biology	2	2	n/a	n/a
36	10	10	10	10	4	20	f	2	BA	math	2	2	3	10
37	10	8	8	10	4	22	f	3	BA	Art History	2	2	5	1
38	8	4.5	5	3	4	18	f	0	BSc	n/a	n/a	1	n/a	n/a

^aOrder of boxes refers to the ordering of boxes in the survey: 1 corresponds to 1, 2, 3, 4; 2 corresponds to 2, 3, 4, 1; 3 corresponds to 3, 4, 1, 2; 4 corresponds to 4, 1, 2, 3.

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